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Listing of Claims:

Claims 1 - 56 (Canceled).

57. [Amended] A device for eliminating an arrhythmogenic focus in a pulmonary vein comprising:

a heating element capable of maintaining a temperature in the range of about 38° C to 48° C over a time period range of about 5 to 60 minutes, said temperature range and time period under those that would induce tissue scarring, blood-clotting or myocyte injury; [and,] at least one detector capable of detecting the presence or absence of an arrhythmogenic focus comprising atrial myocytes; and at an electrical connection from said heating element to said detector capable of regulating the temperature of the heating element in response to arrhythmogenic activity at said focus.

- 58. The device of claim 57, wherein said detector electrically detects the presence of said atrial myocytes by their ectopic electronic emissions.
- 59. The device of claim 57, wherein said detector detects the presence of said atrial myocytes using positron emission tomography.
- 60. The device of claim 59, wherein said detector tracks differential uptake of a radiocontrast agent by said atrial myocytes using positron emission tomography.

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61. The device of claim 57, wherein said detector is capable of thermogenically detecting the presence of said atrial myocytes.

- 62. The device of claim 57, wherein said detector is capable of monitoring apoptosis of said atrial myocytes.
- 63. The device of claim 57, wherein said detector is capable of both detecting the presence of atrial myocytes and of monitoring the removal of said atrial myocytes.